# Ullage Compatible Optical Sensor for Monitoring Safety-Significant Malfunctions, Phase I

Completed Technology Project (2004 - 2004)

## Project Introduction

The tasks of this Phase I proposal are designed to establish the feasibility of an optical sensor for real-time, in situ monitoring of the ullage environment of an aircraft fuel tank. This all-optical fuel tank ullage sensor (FTUS) will be unaffected by fuel splashing and sulfur deposits on the sensor. By combining an innovative oxygen and temperature sensor, this project will enable NASA to offer technologies to monitor the performance of OBIGGS (on-board inert gas generating system). In commercial application, it is imperative that an on-board sensor is in place to identify if OBIGGS, which is safety related, is malfunctioning. FTUS represents a platform technology, which can be used across NASA enterprises, where sensitive monitoring of the ambient environment is required. By using single mode optical fiber in the design, ISL will address size, weight, and cost concerns of the aircraft industry. Tasks are proposed to demonstrate the sensor?s ultrahigh sensitivity and immunity to fuel splashes and deposits of sulfur compounds. To assure success, ISL has assembled a project team having a cumulative 60 person-years of experience in the development of opto-chemical sensors.

## Anticipated Benefits

FTUS will find applications in both new and retrofit of commercial aircrafts. The miniaturization and multianalyte capabilities of these sensors also make them very attractive for applications ranging from environmental monitoring to process control. The sensor market for these applications is growing at nearly 12% per year from $253 million in 1998. Upon repackaging, the device will have immediate applications in a variety of civilian emergency response and occupational environment monitoring or related research facilities.


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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Glenn Research Center (GRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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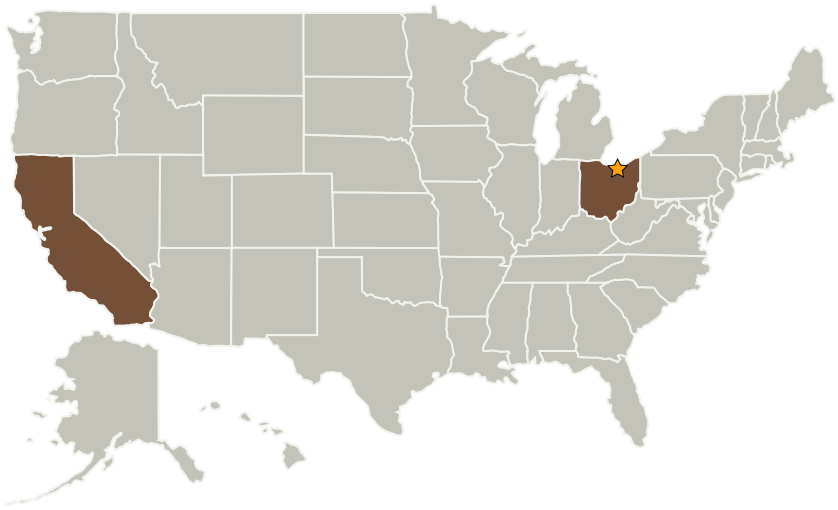
## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Glenn Research Center(GRC) | Lead Organization | NASA Center | Cleveland, Ohio |
| Innosense, LLC | Supporting Organization | Industry<br>Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB) | Torrance, California |

| Primary U.S. Work Locations | |
|---|---|
| California | Ohio |

## Project Management

**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Project Manager:**
Grigory Adamovsky

**Principal Investigator:**
Kisholoy Goswami

## Technology Areas

**Primary:**

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.4 Contact-less / Wearable Human Health and Performance Monitoring